

**“Microinsurance: Income Risk, Social Security and  
the Demand for Private Insurance by the Low-  
Income Population”**

**Executive Summary**

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**1. Microinsurance. 2. Access to market 3. Social Protection 4. Insurance Market 5. Low-Income I. Neri, M.C.; II. Fundação Getulio Vargas (Getulio Vargas Foundation), Instituto Brasileiro de Economia (Brazilian Institute of Economics). Centro de Políticas Sociais (Center for Social Policies).**

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# “Microinsurance: Income Risk, Social Security and the Demand for Private Insurance by the Low-Income Population”

## 1. Objective

The objective of this study is to analyze the demand for private insurance by the low-income population aiming at the development of the emerging industry of microinsurance in the country. The microinsurance improves the ability for low-income individuals to cope with frequent fluctuations in their incomes and other risks. Neri (2000) estimates that the probability of entering poverty is 8.2% between two consecutive months and 9% between two months 12 months apart. In its turn, the role of microinsurance in the softening of adopted living standards depends on how developed the various segments of the financial market are (assets, loans and insurance) and on social security to cushion negative shocks. The evaluation of the microinsurance effects on the well-being, and the demand for different types of microinsurance require an analysis of the dynamics of the individual revenue process and an assessment of substitutes and complementary institutions that condition the respective financial behavior. On the other hand, Brazil has a fairly developed financial system but still not geared towards the poor, especially in what concerns the insurance industry. Finally, there is a relatively developed provision of social security by the Brazilian government considering other countries of similar revenue level. This requires a private industry of microinsurance well attuned to new business opportunities for people with upward mobility in need of protection to maintain the standard of living they have recently attained and to move down the income scale in the provision of insurance to levels it had never reached before. This overlap of effects and changes in opposite directions requires an empirical work to guide the companies that want to explore the microinsurance market in Brazil .

The provision of insurance against uncertainty is present in various dimensions of people's lives, such as provisions related to illness, unemployment, accidents, theft, and death among others. We talk about the insurance purchased in the private market and the so-called social security, including mechanisms of protection offered by the State and social networks within the society.

### Type of Insurance

Private  
Health Life Car Real Estate Pension Fund

### Social

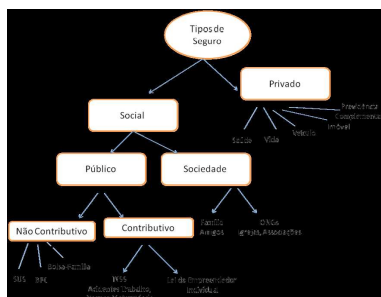
Public Society  
Family / Friends  
NGOs / Churches / Associations

### Non-Contributive

SUS (Public Health Insurance)  
BPC  
Bolsa Família (Family Allowance Program)

### Contributive

INSS (National Social Security Institute)  
Work-related Accident  
Maternity Allowance  
Law of the Individual Entrepreneur



In the case of public-based social insurance, it is worthwhile differentiating the contributory from the non-contributory ones. Examples of the first type are found in work-related accident insurance and maternity leave from the INSS (Brazilian Social Security Institution). Examples of non-contributory forms of public insurance are the National Health System (SUS), the Bolsa-Família (Family Allowance Program), the Continuous Cash Benefit (BPC) and unemployment insurance. In society, the basic unit of risk sharing is the family, supplemented by relations of friendship and help from non-family members.

The integration of different forms of insurance will be made through the discrimination of different monetary insurance expenses observed in the Consumer Expenditure Survey (POF). The first challenge is to identify relations of complementarities and substitution between various types of public insurance, family protection and insurance acquired in private markets. We will do a cross analysis of components of different types of insurance and the demand for private insurance. In other words, we will observe to what extent the presence of other private, public and family devices to reduce risk, affect the private behavior of insurance purchasing. For example, to what extent the contribution to public pensions affects the demand for specific private insurance as health or life insurance. Another challenge is to incorporate the effects of different types of risk on the demand for insurance covers such as those associated with unemployment, age, violence etc. Regarding family relations, we will work with the concepts of insurance expenditure within families per capita, and individual-based, as extreme scenarios of the operation, or not, with mechanisms of risk diversification within households. During the research, we will study in detail the relationship between insurance demand and income in order to understand the potential of microinsurance considering the changes in income distribution and in the supply of products more suited to the low-income population. The work is composed of central sections as stated below:

2. The Reasons of the Insurance Consumer: Theory
3. Definition of Microinsurance
4. The Market for Microinsurance
5. What are the main determinant factors in the demand for Microinsurance?
6. The Current Market for Insurance and Microinsurance
7. Substitution and Complementarities between Different Types of Microinsurance
8. Breakdown of the Demand for Microinsurance

### **Research Site**

The research site [www.fgv.br/cps/microseguro/](http://www.fgv.br/cps/microseguro/) offers a broad database with interactive and user-friendly devices for data searching.

## **2. The Reasons of the Insurance Consumer**

The purpose of this section in the light of the economic literature is to make a brief conceptual description of the motivations behind the behavior of the demand for different types of insurance by individuals. The appropriate basis for analysis of all real and financial assets and services seen as a whole is the inter-temporal choice theory, which analyzes the dilemmas between the future and the present time in a context of uncertainty. We discuss extensions of this basic inter-temporal apparatus to model the individual decision to purchase different types of insurance throughout the life cycle. According to the vast literature on financial behavior of households, the demand for binomial savings / insurance would be induced by some fundamental factors beyond the softening of the consumption over time. Some of these factors create in the field of the literature on savings (or self-insurance) specific reasons, which, if applied to the understanding of the demand for insurance, could lead to policies with specific characteristics, namely:

**Precaution reasons**, in a situation of uncertainty about income or expenses in the future, one can opt for health insurance, unemployment insurance, credit life insurance;

**Car insurance, property** and productive assets related to businesses that are indivisible assets of high unit value especially for the poor in a context of credit crunch;

**Complementary pension** acts as an important protection against reduction of work-related income and the impact of health-related problems on the financial situation of the elderly;

**Life insurance** covers living expenses of the spouse and children facing the risk of the policyholder's death.

These reasons are enhanced with low-income individuals. Not to mention that the poor in Brazil tend to be more susceptible to volatility as far as income is concerned (Neri et al 1999). However, low-income individuals represent a small number in the insurance market, either because they lack knowledge about the services offered by insurers, or because they lack knowledge about insurance companies for informal customers due to the difficulty of observation and good databases about it. In addition, because the values involved are low, the dilution of fixed operational and registration costs are difficult. These factors should support the case for the development of the microinsurance industry in the country.

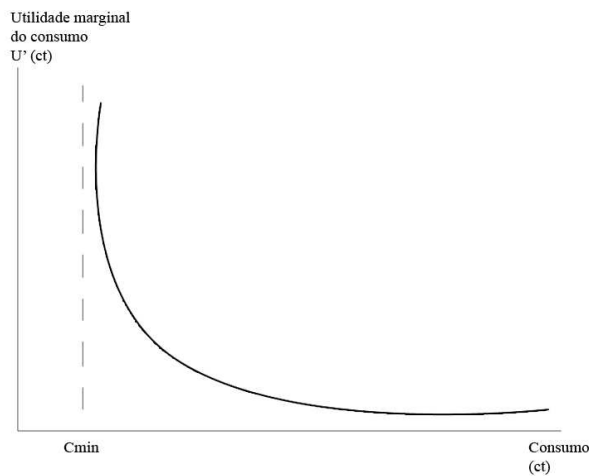
### **i. Covering the Income**

The demand for insurance is due to uncertainties that affect the well-being of people. Since insurance provides resources that will be available in the future in the event of adverse conditions, the decision on requiring insurance or self-insurance through savings is also related to the nature and extent of uncertainty. The idea is that in bad times, when consumption levels are low, the consequences are much worse than in good times, when the consumption levels are high. Therefore, the drop in consumption close to subsistence levels is greater than the gains in case of positive surprises. Poor people should be prepared for adverse conditions, demanding, if possible, insurance in the market, or self-insurance through savings. In this sense, these financial instruments should not be seen as luxury services.

# Survival Restriction

## Marginal Utility of Consumption

$U'(ct)$     $C_{min}$    Consumption (ct)



The more uncertain the future income is, the greater the demand for insurance or self-insurance and the lower the present consumption of other goods and services. This precautionary motive is strengthened by the existence of restrictions on credit. The possibility to borrow in bad times is an alternative that provides certainty.

A side effect of the stabilization of individual risks is the reduction of the demand for private insurance. The same type of argument can be applied to the provision of social insurances by the State or the actual macroeconomic stabilization. For example, the Constitution of 1988 universalized the access to health through SUS whilst providing job stability to the public service by reducing the demand for specific insurances such as health and credit life insurances, respectively.

## ii. Life Insurance

An important source of uncertainty is related to the moment of death of the individual. The higher life expectancy is, the lower the consumption made after retirement will be for a given level of resources. Therefore, how much to save for retirement depends on the degree of uncertainty about how long people will live. In the case of altruism, people want to demand life insurance to guarantee the standard of living of their spouses and descendants. Regarding the uncertainty of the date of death, this applies more to the provision of annuities or to the system practice of public and private pensions.

## iii. Complementary Private Pension

Saving for retirement derives from the individual desire to maintain a stable pattern of consumption over a life cycle. As a result, individuals give up a share of consumption during the active life in order to stabilize the pattern of consumption in old age, when a fall in work-related income happens due to the retirement or increased costs because of higher health risks in the third age. There are factors that affect preferences, needs and the actual work-related income over the life cycle. More frequent adverse health conditions in the elderly result in precautionary effects and explain the increased demand for insurance in the late stage of the life cycle. Family size is another factor, as consumer-spending power will reach its peak in middle age inhibiting the demand for insurance up to then.

#### **iv. Real Estate and Auto insurances**

Accumulation for the purchase of indivisible assets, represented mainly by real estate and automobiles, results from the fact that the flow of monthly income taken individually is not sufficient to purchase indivisible assets of high unit value. This situation is induced by the lack of perfect credit markets, which are inductor of liquidity constraints.

Insurance of specific assets would result from the interaction of two factors: the indivisibility of assets and imperfections in the credit market. Individuals without credit in the case of an adverse shock have to build up resources on their own over a period of time until they can get the indivisible asset without the benefit of any service. Similarly, people who want to restart a new business are often frustrated by the lack of access to capital markets, being forced to do early financial accumulation and purchase protection against property.

### **3. Definition of Microinsurance**

The key variable for the definition of microinsurance market is the income of the individual and not the type of the product offered. In other words, the prefix micro is more adjective for the target-public rather than substantive for the financial service provided. The credit microinsurance fits in the field of microfinance, providing insurance to customers not served by the traditional financial sector. Microfinance refers to a range of diverse financial services, including microcredit, microsavings, mortgages, remittances of immigrants in addition to microinsurance, to name just the main ones. Other examples of programs in the field of microfinance would be the opening of banking services in the traditional commerce (.e.g. grocery stores).

The key of the success of microfinance is to develop technologies to provide sustainable financial services to informal poor clients, such as viable channels of distribution of insurance to reduce the transaction costs of small loans and overcome the fixed costs associated with low value policies.

The relationship between insured companies and policyholders is marked by an asymmetry of information in two categories: adverse selection and moral hazard. The first involves the lack of information of the insurer about the insured (how honest he is, how responsible, etc.). In its turn, the moral hazard involves a lack of information of the insurer about the type of behavior that the insured may have under insurance protection. The existence of asymmetry in the evaluation of contracts provides a small number of insurance covers in relation to the need of people. A very common strategy explores repeated interactions between insurers and policyholders: the bank provides increasing insurance premiums over a period of time, conditional on the non-occurrence of claims in previous periods and refusing the renewal of insurance if a more extreme case occurs.

One of the secrets of microinsurance success is the loyalty of customers, which is achieved by institutions trusting their customers and by the good services provided to them. It is necessary to deeply know the customers and to seek products that meet their needs. An important feature would be the direct and personal contact between officials of the insurance institution and its customers. It is important to consider the cost of monitoring the insured. When it comes to small insurance, these expenses can become so large that they do not justify the provision of insurance. Then, the creation of solidarity groups of insurance, similarly to what happens in the microcredit field can help to keep these costs down. A complementary solution is to transfer the cost of monitoring to a third part such as an insurance agent. Employees accompanying the insured, which preferably are paid according to their performance, help to align the various incentives which are directed towards the various players with the success of the initiative.

## **Fundamental Players of the Microinsurance**

Insurance Agent      Insurance Company      Insured

Insured

### **Solidary Group**

Another aspect is the approach of taking advantage of economies of scale and of scope used by public policies. For example, the registration of the low-income population, designed to allow credit institutions to benefit from this cost already accounted for, could use access to social programs, such as Bolsa Familia. Another possibility related to the combination of microinsurance with other public policies is the idea to consign the income derived from public pension and revenue transfer programs.

## **Defining Microinsurance in Brazil**

As we said, the market for microinsurance is not defined by the amount involved in the commercialized insurance, but the income of its potential consumers. This definition has fundamental importance for the realization of the empirical part of the project. A natural candidate to define the target audience for microinsurance is the use of fractions or multiples of the minimum wage, which is not the most appropriate index, since the minimum wage value has suffered successive adjustments over time (e.g., a real gain of 44.7% since 2003). Therefore, when we use the minimum wage as a parameter we get the false impression of constant real value over time, and we put the focus on the microinsurance market in second place to unrelated discussions of public policy. There is also a strong concentration of mass of the distribution in multiples (or accurate fractions) of the minimum wage not only in the revenue from formal and informal employment, but specially from contributory and non-contributory social programs (pensions, unemployment insurance, BPC (Loas) etc.). For that reason, there is a small adjustment to the real price in the minimum wage (let's say by 0.00000001% real, i.e. virtually zero can cause large variations in population around the cut line used due to the effect of the new value of the benefits granted).

We suggest incorporating the definitions of economic classes developed by FGV for a few reasons;

i) It generates the division of classes E, D, C and A / B, and it is already present in the culture of private companies. The classification of classes of FGV is close to the classification distribution of ABIPEME, but it is directly expressed in per capita household incomes, which is the unit of this project. As the FGV has generated periodic updates on the estimates concerning the size of these classes through searches of public access using the PNADs and PMEs, there is an automatic feedback of future possibilities for analysis.

ii) The definition of income classes by the FGV incorporates regional differences in cost of living that affect the purchasing power of present and potential insurance consumers. Class E of the FGV class system matches the definition of poverty used by the institution since 2000. Since there is no official poverty line in Brazil, the FGV definition of poverty is used by official bodies such as the Ministry of Finance and the Ministry of Social Development. The criterion for access to Bolsa Família (Family Allowance Program) today is 137 reais per family per capita, which is relatively close to the FGV regional poverty lines, which are on average 134. In other words, it is relatively close, but not exactly equal to the values of the first part of the access of the Bolsa Família.

The database of the project calculates all statistics for levels of accumulated income of 1 minimum wage, 2 minimum wages and 3 minimum wages, as well as classes CDE, DE and E, C, D, AB in isolation, in order to allow each one to address the various levels of the microinsurance segment and its relationship with the total market. We also created a device that allows everyone to simulate what percentage of the distribution below for each income value. See <http://www.fgv.br/ibrecps/RETC.M/Lorenz/index.htm>.

This approach made by groups or classes of income permits to differentiate strategies according to the strengths and weaknesses of each segment. For example, in class E we explore relationships of complementarities with the Bolsa Família Program, using databases and distributed income. In addition, typically for classes D and C, we explore possibilities of consignment of social benefits for paying insurance installments and even credit of premiums in the event of losses.

The participation of the class CDE with 83.83% is comparable to 3 minimum wages per capita of the time of the POF, which represents 84.68% of the population. In other words, the absolute difference in size between the two criteria is relatively small.

To summarize what has been illustrated in this work, the calculations were based on households per capita, but expressed here as total household income from all sources per month, at prices of December 2008: Classes E up to R\$ 804, D up to R\$ 1,115, C up to R\$ 4,807, and AB upwards. We analyzed in Annex 6 changes in the distribution of economic classes until June 2009.

#### **4. The Microinsurance Market**

We try to measure the effective demand for insurance and microinsurance, using microdata from the Consumer Expenditure Survey (POF / IBGE). In 2002 and 2003, the IBGE made an external survey and collected information from 48,470 households, covering a sample of 182 thousand individuals. The purpose of using the POF is to outline the characteristics and profile of individual and family expenses with different insurance products (including the access, total expenses) for various segments of the Brazilian population. We focus our analysis on the expenses for people over 15 years of age, who have answered the questions in the expenses questionnaire.

## i. The Insurance Market

The average rate for the access to insurance in this population is 16.79%. In other words, the fraction of the population who has at least one type of private insurance, as indicated in the survey questionnaire, such as health insurance, life insurance, car insurance, private pension funds and other types of insurance. The health insurance is the most widespread covering 12.94% of the population over 15 years of age, followed by life insurance 4.31%, car insurance 2.95%, pension funds 0.45% with the portfolio complemented by other insurance 1.41%.

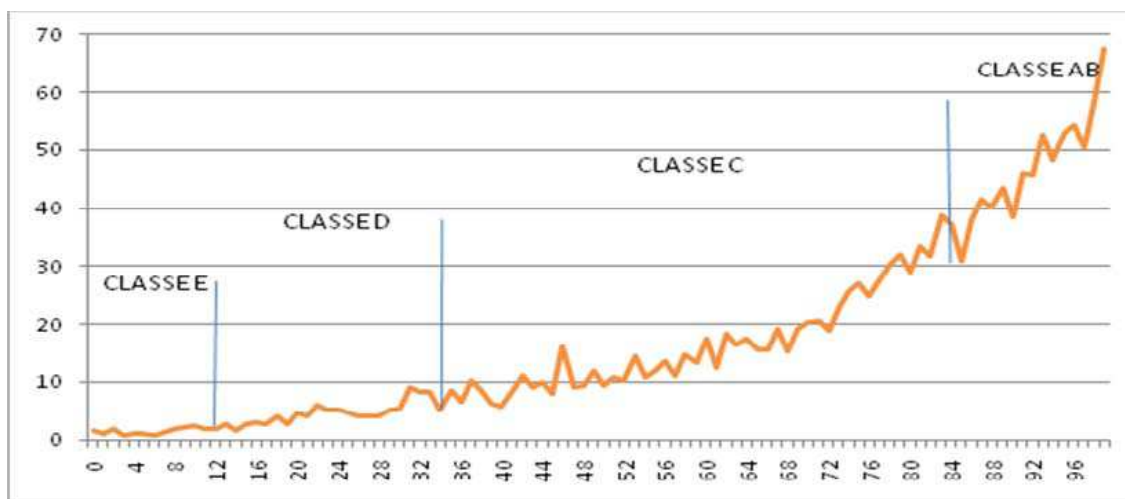
Alternatively, if the metric is the amount of expenses at the general level of prices in December 2008, each Brazilian over 15 years of age spends an average of R\$ 23.96 per month in insurance, and R\$ 16.79 in monthly installments of health plan, R\$ 3.22 in car insurance, R\$ 2.17 in life insurance, R\$ 1.03 in private pension and R\$ 0.75 in other insurance. That is, 70.1% of the expenses for insurance are allocated with health plans.

## ii. The Insurance Market

Our focus is the so-called microinsurance. We began with a general approach to microinsurance looking at the distribution of insurance throughout the income distribution, we ordered the incomes from the poorest to the richest, and then we divided into one hundred equal pieces. The two graphs below show the evolution of expenditure of the distribution by hundredths. In other words, what would be the access and spending on insurance in the margin in each hundredth of the distribution of household income per capita.

### Marginal Rate of Access to Insurance per Hundredth of Income Per Capita -%

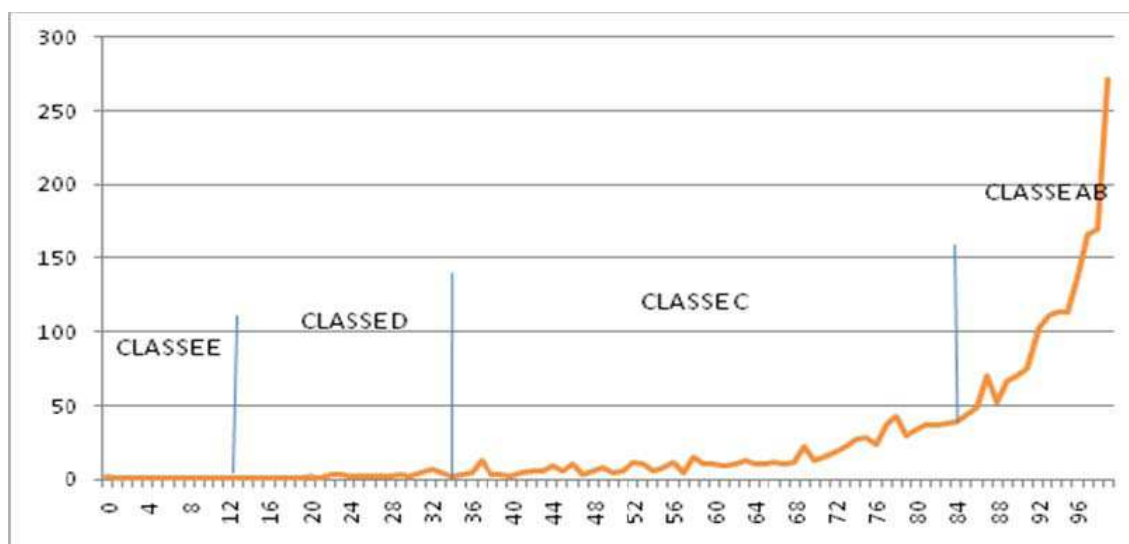
Class E  
Class F  
Class C  
Class AB



Source: CPS/FGV from the POF/IBGE's microdata

## Value of Marginal Expense in Insurance per Hundredth of Income Per Capita -%

Class E  
Class F  
Class C  
Class AB



Source: CPS/FGV from the POF/IBGE's microdata

The goal of the graphs above is to provide an idea of how the demand for insurance changes according to different income levels. The analysis of expenses at the margin is used to analyze the relationship between income per capita and the different types of insurance. For example, if we set the focus on the poor identified by the FGV poverty line, corresponding to class E following the methodology of the same institution, the access rate is 1.44% and the average monthly expense on insurance is R\$ 0,55. The income on the border between classes C and D of these variables correspond to 1.93% and R\$ 0.66. If we consider classes C, D and E taken together as a target audience of microinsurance the access rate and the average expense would be 10.77% and R\$ 8.55, respectively. These figures are the most fundamental of this exercise to be kept in mind. In the boundary between classes C and B, these respective numbers would correspond to 34.70% and R\$ 37.26.

### Marginal Rate of Access to Insurance per Groups of Income

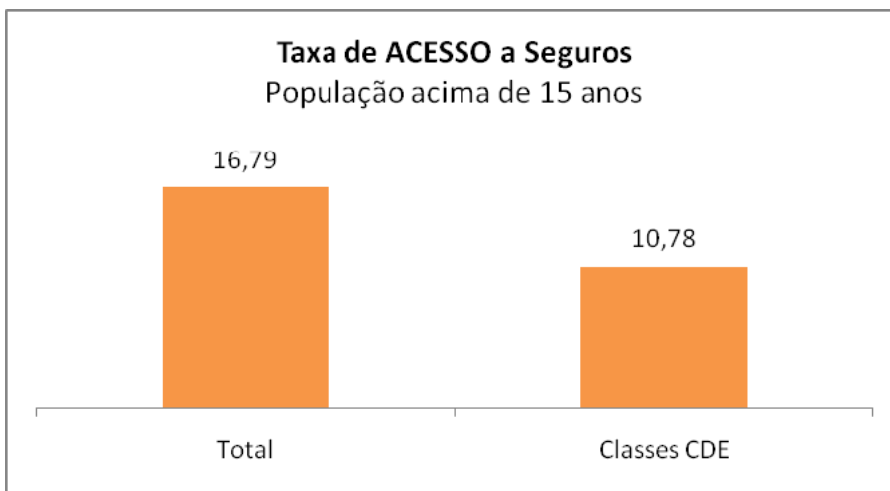
Classes	RFPC	TOTAL INSURANCE	HEALTH	CAR	LIFE	PENSION	OTHER
E	130,95	1,93	0,96	0,24	0,36	0,01	0,50
D e E	277,13	8,55	2,05	0,07	0,75	0,09	0,63
C, D e E	1172,45	34,70	8,10	0,73	2,58	0,16	1,20
Total	8297,63	62,94	51,42	23,92	20,86	4,14	2,12

Source: CPS/FGV from the POF/IBGE's microdata

The Class CDE, that is central to this study, presents an access rate of 10.78% and an average monthly expense of R\$8.56 per person. I would like to emphasize the proximity to the statistics of the income level per capita of up to 3 minimum wages with an access rate of 11.08% and average monthly expenses of R\$ 8.89 per person. The proximity in population size of the two criteria respectively explains the proximity of access rates.

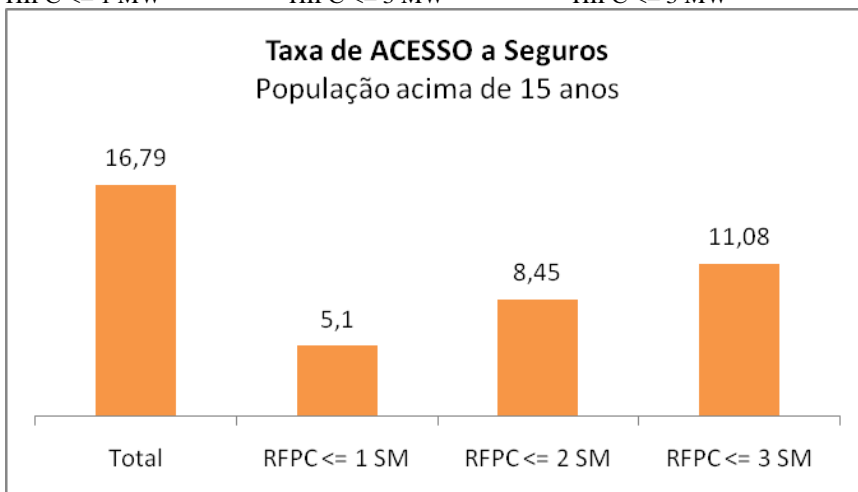
The other point to be emphasized is that despite the fact that the class CDE includes almost 85% of the population there is a significant difference in the access rate compared to the total population of 55.75% (16.79% versus 10.78%) and average expenditure per person of 169.5% (R\$ 23,96 to R\$ 8.89). In the case of average expenses, differentials in access are added to the differential in expenses of those who have positive insurance expenditure. This reflects the fact that the class AB has a level of demand far greater than other classes with access rate of 3 and average cost of R\$ 99.29.

Rate of Access to Insurance  
 Population over 15 years of age  
 Total  
 Classes CDE



Source: CPS/FGV from the POF/IBGE's microdata

Rate of Access to Insurance  
 Population over 15 years of age  
 Total  
 HIPC <= 1 MW  
 HIPC <= 3 MW  
 HIPC <= 3 MW



Source: CPS/FGV from the POF/IBGE's microdata

## Panorama of Access to Microinsurance

The panorama constructed from the POF (Household Expenditure Survey) is an interactive database that allows the assessment of the access to and average expenditure on different insurance items from the simple crossing of the variables. *Link*

<http://www.fgv.br/ibrecps/miseg/despesas/index2.htm>

The screenshot shows the 'Panorama das Despesas de Seguro' web interface. At the top left is the FGV logo with 'CPS/IBRE' and 'cps' below it. At the top right is the 'C P S' logo with 'Centro de Políticas Sociais' below it. The main title is 'Panorama das Despesas de Seguro'. Below the title is a 'Universe of Analysis' section with a dropdown menu for 'Universe of Analysis' showing 'Total', 'Classe E', 'Classe D', 'Classe C', and 'Classe AB'. To the right of this are two dropdown menus: 'Região' set to 'Brasil' and 'Tipos de Despesa' set to 'Individual filtro de acima de 15 anos'. Below these are two more dropdown menus: 'Análise' set to 'Despesa' and 'Universo' set to 'Total'. A note below these says '\* Segure a tecla 'CTRL' para marcação de 2 análises simultâneas.' Below the note are three buttons: 'Gerar tabelas', 'Limpar seleção', and 'Selecionar todas'. Below the buttons are two sections: 'Características Demográficas' and 'Características Sócio-Econômicas'. The 'Características Demográficas' section has checkboxes for 'População Total' (checked), 'Sexo', 'Anos de Estudo', 'Frequente Escola ou Creche', 'Escolaridade', and 'Raça'. The 'Características Sócio-Econômicas' section has checkboxes for 'Posição na Família' and 'Idade'.

What follows is an analysis of the portfolio of individual insurances by different economic classes. In the case of health plans, the most widespread of all, the rates range from 0.76% for Class E to 36.65 in Class AB. Then, we find car insurance (ranging from 0.05% to 13.84%) and life (0.29% to 12.88%). Private pension funds and other types of insurance are even less present, even considering individuals with the highest income (access rates are respectively 1.91% and 2.43% for Class AB). The table below shows the distribution of people with access to insurance per income categories.

% of the Population with Insurance expenses per Economic Class Brazil – Individuals over 15 years of age								
Class	Insurance	Health Plan/Insurance	Car Insurance	Life Insurance	Open or Close Private Pension Funds	Other	Expenses with Health	Expenses with Health (without a plan)
Class E	1,45	0,76	0,05	0,29	0,01	0,44	5,92	0,053
Class D	4,19	2,64	0,09	1,01	0,13	0,74	11,87	0,0992
Class C	15,69	12,07	1,15	3,74	0,2	1,56	26,49	0,1785
Class AB	46,17	36,65	13,84	12,88	1,91	2,43	52,72	0,3015

## 5 . What are the main determinant factors in the demand for Microinsurance?

We started by exploring the abundance of information from the POF having as a basis a selection model of variables according to the level of statistical significance related to the demand for insurance. Subsequently, we delineated a more parsimonious model from available variables in other databases such as the PNAD, which allow simulating the demand for insurance. The first exercise works as part of the learning process to reach a model applied to various types of insurance. In order to determine which ones have more explanatory power and which would be more relevant, a sequential procedure of variables choice using a binomial logistic model was used.

The list of variables selected for each model (from an F-test) is presented below in a self-explanatory list of 11 variables in order of importance. Eliminated<sup>1</sup> variables were not displayed on the table:

<i>STEPWISE</i> Model for selection of variables		
Insurance Expenses		
ORDER OF ENTRY IN THE MODEL		
Insurance		Microinsurance
Economic Class	1	3
Possession of Credit Card	2	1
Pension Fund Participant	3	2
Position in the Family	4	5
Years of study	5	6
State	6	7
Age Group	7	9
Car financing	8	10
Employment status	9	8
Car ownership	10	4
Area – Size of city	11	11
School or daycare attendance	-	12

Source: CPS/FGV from the POF/IBGE's microdata

First of all, it is worth pointing out the relative importance of economic variables, which seems to be greater than the socio-demographic and spatial variables when explaining the demand for insurance and microinsurance as well (note: we will present microinsurance data in parentheses to facilitate the comparison variable by variable). It is also worth noting that the variable *income class* was the first to enter the insurance model (and 3<sup>rd</sup> to enter the microinsurance, when the truncation of the sample was used with the removal of class AB), before *full years of study*, in 5<sup>th</sup> place (falling to 6<sup>th</sup> in microinsurance), which typically has the highest explanatory power in empirical research on inequality.

<sup>1</sup> Gender, color / race; installment payment delays for goods / services, religion, income difficulties, problems with violence, with expenses in real estate (cash or in installments); capital

It is worth noting that we are not talking about the magnitude of the coefficient for each category, but the explanatory power of the set of categories to explain the use of insurance (and microinsurance). When we look at the magnitude of the extreme categories for each variable, keeping other characteristics constant, the chances of a person in the class AB to use insurance is 690% greater than one person in the class E, while a person with university level is 248 % more likely to have access to insurance than a person of up to three years of study, i.e., a functional illiterate (in the case of microinsurance this difference is 173%). The *possession of credit card* is presented as the second most relevant variable to explain the use of private insurance in general (and first in microinsurance). Those, who have no credit card, have a 61.3% lower chance of having insurance than someone who has it (in the case of microinsurance the respective difference is 62.3% lower). The indicative variable for contribution to official pension funds is the third to enter the insurance model (and 2<sup>nd</sup> in the microinsurance) and it indicates that those who have contributed have a 50.5% greater chance than someone who has not contributed (in the case of microinsurance this difference is 53.4%). A major difference between the two models of demand for insurance and microinsurance is the importance of the variable *car-ownership*, which is the 10<sup>th</sup> in the case of insurance and 4<sup>th</sup> in the case of microinsurance. This indicates that having access to car ownership has a high proportion of influence in the purchase of insurance on the income distribution basis.

Following the order of statistical significance of the insurance model, we have two socio-demographic variables. In fourth place, the variable *position in the family* (5<sup>th</sup> in the case of microinsurance). The coefficient of the variable *spouse* is 40.6% higher in the case of insurance than the person of the indicative reference (33.7% for microinsurance) and similar differences in comparison with other types of members at home as children, other relatives etc. (but somewhat larger differences in the case of microinsurance). The fifth variable already mentioned was the one regarding the completed *years of study*, followed by *State*, where the state of São Paulo presents higher access rates to insurance than other 26 states. This indicates that São Paulo is not more sophisticated just because of the distribution of socio-demographic and economic attributes (the same occurs in microinsurance, indicating that São Paulo has a greater degree of financial sophistication controlled at the base of the pyramid).

The *age distribution* appears as a seventh variable in terms of explanatory power. We found a marked monotonic upward trend indicating an increase in the chances of access to private insurance in the range from 15 - 20 to 50 - 59 years of age, when generally speaking, the access rate stabilizes itself at the top end (the same standard of cycle life is found in the case of microinsurance).

It should be noticed the importance of indicative variables of *car ownership* (10<sup>th</sup> in the demand for insurance as stated above and 4<sup>th</sup> in the case of microinsurance) and *car financing* (8<sup>th</sup> in the case of insurance and 10<sup>th</sup> in the case of microinsurance) and *employment status* (9<sup>th</sup> in the demand for insurance and 8<sup>th</sup> in the case of microinsurance), followed by the *size of city* (11<sup>th</sup> in the demand for insurance and microinsurance). As important as the presence is the absence of joint statistical significance of other variables, such as the perception of violence in the neighborhood of residence by the interviewed person, the perception of insufficient income and other variables, such as *delay of installment payments for the purchase of goods*, *recent purchase of property in cash or in installments* or socio-demographic variables related to gender (relative to the position in the family), race and religion. In short, the exercise of variables selection in both market segments

reveals the importance of education and the role in the family, but it leaves no room for other variables of demographic targeting while making room for spatial targeting. Selected economic variables play a key role in the demand for insurance, especially in relation to the economic class under analysis. This is of fundamental importance not only for the case of microinsurance, but for the aggregate demand for insurance taking into account the inflection in the composition of income groups observed in Brazil in recent years. We will return to this point later, when we will establish estimates of the current insurance market, also including the period after the beginning of the crisis in September 2008.

**What are the determinant factors in the Demand for Microinsurance by sector?**

What follows is an analysis of the main determinant factors of the portfolio of individual insurances by different economic classes. Continuing with the previous results, the most important variable in all types of insurance, when looked in isolation, is *economic class*. However, when we evaluate the same variable in the microinsurance model, it occupies the lower positions, such as health insurance (3<sup>rd</sup> position), car (10<sup>th</sup>), life (4<sup>th</sup>) and pension (excluded from the model). Following this line of interpretation, other economic variables lead the ranking of importance in the estimated model. The *credit card* should be highlighted, as it is part of all estimated models. In models of health insurance, life insurance and retirement plans, it is the main variable, apart from income, both in the case of insurance and microinsurance. *The car* variable, both concerning ownership and as expenses, has a relevant role in car insurance. We shall exemplify the above with the health insurance type, which is the most popular one.

<b>STEPWISE Model for selection of variables</b>		
<b>Health Insurance Expenses</b>		
<b>ORDER OF ENTRY IN THE MODEL</b>		
	<b>Insurance</b>	<b>Microinsurance</b>
<b>Economic Class</b>	1	3
<b>Possession of Credit Card</b>	2	1
<b>Pension Fund Participant</b>	3	2
<b>Years of study</b>	4	4
<b>Age Group</b>	5	5
<b>State</b>	6	6
<b>Position in the Family</b>	7	10
<b>Employment status</b>	8	7
<b>Area – Size of city</b>	9	8
<b>Car ownership</b>	10	9
<b>Car Financing</b>	11	11
<b>Gender</b>	12	-

Source: CPS/FGV from the POF/IBGE's microdata

**Household Income Per Capita vs. Individual Income: Family is what Matters**

We made other exercises of selection with a greater number of socio-economic variables<sup>2</sup>. In the category income, we included, in addition to economy class, the household income per capita and the individual income of each family member to make a "horse race" among these variables to verify which one would have more explanatory power. Just as with the models already discussed, despite having included continuous approximations of individual and per capita income in all models of insurance demand *lato senso*, the economic class based on per capita household

income appears as the most important variable. As we can see in the table, per capita household income is an important tool in determining access to insurance, and even more important in the case of microinsurance, where it occupies the top positions. On the other hand, individual income does not fall within any estimated models. In short, the demand for various types of insurance and microinsurance are highly related to income. The income that matters for private insurance demand is the household income and not the individual one.

<sup>2</sup> Gender, color / race, position in the family, age group, years of education, economic class, region - area of home, delay in the provision of goods / services; state, religion, income difficulties, school attendance, problems with violence, credit card ownership; pension funds participant, status in employment, car ownership, car expenses, expenses in cash with real estate, expenses in installments with real estate, capital, per capita household income and individual income.

### Real Estate Insurance: Controlled Access

We replicated the same previous exercises for real estate insurance. We treat this expense separately from the others because it is a collective expense. In order to make them more compatible with other insurances in terms of analysis, we calculate this information in per capita levels, i.e. we divide proportionally the expenses declared in the questionnaire by the collective family members. The results presented are not very different to the other items of insurance when controlled through economic variables. In what concerns the socio-demographic variables, we did not find any major statistical significance (it is worth remembering the family characteristic of this type of insurance), while some particularities are found in the spatial variables.

### Inequality of Expenses on Insurance

In the light of the results discussed above, we made an estimate for the inequality of expenses on insurance for the population with expenses and for the population as a whole. When we analyzed the total population, which would be the most relevant because it combines both the inequality in the access rate and the intensity of use, we observed a Gini coefficient close to the unit value, the upper limit of perfect inequality. The Gini index increases from the expenses with health insurance to other insurances, such as car and life, in this order, reaching its peak with the expenses on private pensions, which are the highest, at 0.9985.

EXPENSES with INSURANCE			
Total Population			
AVERAGE	GINI		Income Elasticity
Income Per Capita	832,85	0,5768	□
Total Expenses	23,96	0,9349	1,6207
Health Insurance	16,80	0,9448	1,6379
Car Insurance	3,22	0,9812	1,7010
Life Insurance	2,17	0,9860	1,7094
Private Pension Fund	1,03	0,9985	1,7311

Source: CPS/FGV from the POF/IBGE's microdata

### Expense Equations of Insurance and Microinsurance

The first part of the multivariate analysis has been related to possible determinant factors of access to insurance for the low-income population, now we are doing an analogous analysis applied to the determinant factors of increased spending on insurance. Before, the variable access was discrete, like *had or did not have* insurance expenses. The analysis on the proportion of expenses is of a continuous nature, complementing the previous one, deepening the determinant factors for demand among those who had access and had used these financial instruments. That is, the sample studied here is restricted to those who had positive expenses. We have replicated the same previous selection procedure of sequenced variables having as a starting point the level of statistical significance in models that estimate the expense log. The list of selected variables for each model is provided below in

order of importance through a self-explanatory list of 10 variables. Eliminated variables were not displayed on the table:

<b>STEPWISE Model for selection of variables</b>		
<b>Expense Equations of Insurance</b>		
<b>ORDER OF ENTRY IN THE MODEL</b>		
	<b>Insurance</b>	<b>Microinsurance</b>
<b>Economic Class</b>	1	5
<b>Groups of Age</b>	2	2
<b>Years of Study</b>	3	1
<b>Car ownership</b>	4	3
<b>Possession of Credit Card</b>	5	4
<b>Employment status</b>	6	-
<b>Area – Size of City</b>	7	6
<b>Car Financing</b>	8	-
<b>Position in the Family</b>	9	-
<b>State</b>	10	-
<b>Pension Fund Participant</b>	-	7

Source: CPS/FGV from the POF/IBGE's microdata

There is similarity between the results of the equations of access to insurance and the equations of insurance expenses. For example, the class of income continues to be the first variable to enter the insurance expense model (and 5<sup>th</sup> to enter the microinsurance, when we truncate the sample removing the class AB). Controlled results for those who have expenses show that in class AB it is 97% higher than in class E. Some economic variables dropped from position in comparison to the previous year, while others such as age and education gained prominence. The second place among the selected variables in the total (as in Class ABC) is now for a demographic variable: age group, which becomes more relevant in the determination of expenses. In this category, the expense variable increases throughout the life cycle. The differences do not stop there: an important variable in determining the demand, the pension fund contribution, did not enter the model of expenses on insurance (and was in 7<sup>th</sup> place, i.e., the last when it comes to explain expenses in microinsurance). Following, in 3<sup>rd</sup> place (1<sup>st</sup>) we have years of study as an important predictor of expenses on insurance (microinsurance). Growing monotonically, as we move from functional illiteracy to higher levels of study, it gets to be 76% higher when the person has 12 or more years of study.

Continuing the analysis for the selection of variables in the equation of expense for different types of insurance, we noticed that the economic class was the only one that entered all models (which did not occur in the case of microinsurance). First place in all the equations, it is again the most important variable.

#### ***Flashes on Distribution of Income and Poverty***

Studies made by the Center of Social Policy of the Fundação Getúlio Vargas describe the evolution of some moments of income distribution, understood as the size of the “Brazilian people’s pocket”.

The inequality of Brazilian income, which was stagnated between 1970 and 2000, has suffered successive falls, year after year, since 2001, comparable, in magnitude, to the only known

change: the increase of the inequality of the 60's. The rate of income growth between 2001 and 2007 for each tenth of the population is decreasing, as we go from the tenth poorest (49.25%) to the tenth richest (6.70%) person. - As we announced in 2006, Brazil had already accomplished the first, and maybe the most known, of the UN 8 Goals of the Millennium, regarding the reduction of extreme poverty by 50% in 25 years. While the accumulated drop between 1992 and 2005 had been of 54.61%, if we add the year 2006 to the series, we have an accumulated reduction of 57.2%.

How much of income is necessary, on average, for every Brazilian in order for the poor to meet their basic needs in the market? It would require R\$ 9.71 on average per person, to fully alleviate poverty in Brazil, totaling a cost of R\$ 1,776 billion per month and R\$ 21.3 per year.

## **6. The Current Market for Insurance and Microinsurance**

The problem with the POF for our purposes is that it is available in the year 2002-03, which is a little behind in time, to determine the current and potential market for microinsurance. Fortunately, through other studies such as the PNAD and PME, we can create auxiliary variables that allow us to project the evolution of change in the access rate to insurance for more recent periods. We developed the methodology using data on changes in classes of income, and some counterfactual exercises on the insurance market for different classes of income allow us to obtain a more current scenario on the size of markets for insurance and microinsurance in Brazil.

We suggest using the class structure of the PNADs related to 2003 and 2007 to capture the income effect due to improvement of the income distribution, including average and inequality of recent years. From October 2007 to October 2008, we used the PME to generate an approximation in order to obtain a number for the pre-crisis period. Later, we will discuss the composition of classes for the post-crisis period. In this process, 27 million people ascended to the so-called class ABC, 24 million people fell from the class E, i.e., out of poverty. This would be the result of the so-called income effect working in the period.

The financial innovation-effect, that is, the increase of the access rate to different financial services for each income group cannot be estimated directly from existing databases. We propose here to conduct counterfactual exercises such as assuming that Brazil will start to have the distribution of access of more developed places. Let us consider this:

### **The Two Stabilizations and the Distributive Dance**

The crux here is to measure the movements of people between economic levels. This analysis can support public policies in the areas of income transfer (e.g. Bolsa Familia Program and other programs tied to the minimum wage) and income generation (i.e. PAC – Growth Acceleration Program – and employment policies, such as the housing package, now under discussion). This approach also serves to private companies, identifying the fall or expansion of the consumer market and their niches.

Our research (Neri 2008) showed the emergence of Class C, also called the new middle class as a national phenomenon. Before the Real Plan, this class represented less than a third of the Brazilian population: 30.9% in 1993 ascending to 36.5% in 1995 (and also in 2003), reaching 47.1% of the Brazilian population in October 2007, date of last PNAD. In Brazilian big cities, the new middle class was 50.4%. If we make a projection here for the growth of 6% in the last 12 months based on PME from October 2007 to October 2008 and add the nationwide PNAD, we will conclude that 49.2% of the Brazilian population would be in Class C, in October 2008. In a year, when the results of the PNAD 2008, which has just begun, becomes public, we will be able to test the results.

We replicated the same results for the class E, which corresponds to the poor and observed a corresponding reduction of its share in the population at two marked points between 1993 and 1995 (the Real Plan, when it falls from 35% to 28.6% and from 2003 to 2008, when it falls from 28% to 16.2%.

## Scenarios of the access rate to insurance

**a) Income Effect:** We now present the first part of the decomposition. At this stage, we estimated what the income effect in changing the demand for insurance would be, that is, we kept the access rate to insurance invariable (calculated from the POF, in 2003) and evaluated how changes in classes of income between 2003 and 2008 affected the total demand for insurance.

This exercise can be helpful in the following sense: about 7 million people ascended to class AB in the last 5 years, and as we evaluated during the course of the study, class AB has the highest rate of access to insurance (46%). Through the data below, we can see how this change with class AB and with other income levels affects the global demand for insurance. The sum of these income effects indicates an overall increase (0.0262) on the rate of insurances.

**b) Financial Innovation Effect:** The second part of the decomposition corresponds to a simulation about what would be the effect of financial innovation for every economic class in the overall demand for insurance. We will now keep the contribution (weight) of each economic class invariable (reported in the previous section) and we will evaluate how simulated changes of access to insurance for every economic level would affect the size of the insurance market. We had limitations due to the lack of recent data on the access to insurance, therefore, we are working with simulated changes. We use this case to illustrate that the access rate to insurance in Brazil over 2008 reached the scenario presented by the Metropolitan Region of São Paulo, in 2003. The sum of these effects per class indicates an overall increase (0.0243) for the aggregate rate of access to insurance, if the level of financial sophistication in Brazil were equal to the level of São Paulo.

**c) Total Effect (A + B):** Finally, the sum of the income effects and the financial innovation indicates a total improvement in the access rate to insurance of 0.0505 (or 5.05%), which would mean that approximately half of it was caused by changes in income distribution, by the growth of classes AB and C and corresponding reductions in the other half of the population due to the progress made in the access to insurance for the original level observed in the Metropolitan Region of São Paulo<sup>3</sup>. The following, is a chart that combines the results found for each type of insurance taken in isolation.

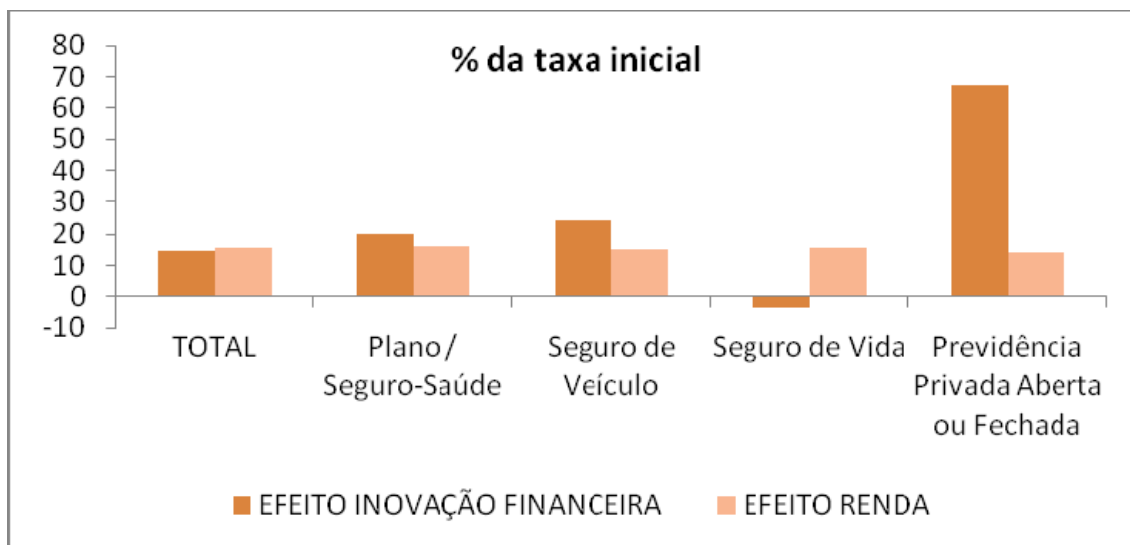
<sup>3</sup> We analyzed the value of the insurance expenses for each income class. We omitted this part in the summary .

### SIMULATION OF THE VARIATION OF THE ACCESS RATE TO INSURANCE FINANCIAL SCENARIO: THE METROPOLITAN REGION OF SÃO PAULO

#### % of the initial rate

TOTAL  
Health Plan /Insurance  
Car Insurance  
Life Insurance  
Open or Closed Private Pension Fund

**FINANCIAL INNOVATION EFFECT  
INCOME EFFECT**



Source: CPS/FGV from the PNAD, PME e POF / IBGE's microdata

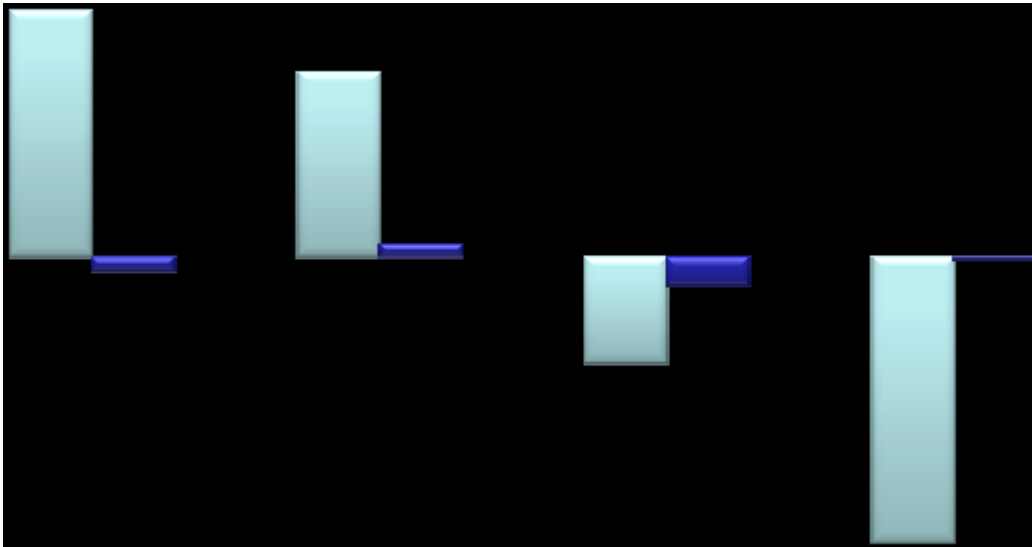
**The Crisis and the Sudden Halt**

If we calculate the changes on income of the last two years (until June 2009) based on PME (see the Annex to this paper), there was an improvement in the purchasing power of Brazilians in large cities. The cumulative increase since June 2003 of classes AB and C was of 31.5% and 27.8% respectively, with a corresponding reduction in the participation of classes D and E, from -18% and -39.8%. This movement, which shifts a mass of people from the bottom to the top of the income distribution, was proportionally stronger in the extremes of the distribution, with emphasis on the relative growth of Class A / B which was greater than the often mentioned class C - the new emerging middle class, and reduction of class E, the poorest class.

The graph shows that in the post-crisis period, trends of recent years have been altered: the classes that had more participation, ceased to have it, though there was no reversal in the sense of great losses. It was, above all, a sudden halt of the gains observed in previous years.

**Pre and Post-Crisis: Cumulated Variation in the Economic Classes**

Class AB	Class C	Class D	Class E
From jun03 to jun08		From jun08 to jun09	



Source: CPS/IBRE/FGV from PME/IBGE's microdata.

### 7. Substitution and Complementarities between Different Types of Microinsurance

What follows is an analysis of the determinant factors of the demand for insurance by exploring the interaction between different types of insurance. We prefer to perform this analysis separately, because we believe it is only an indicative of the relationship between the uses of different financial instruments.

#### Access Matrixes to Different Types of Insurance

Listed below are the access matrixes to different types of insurance. Data is presented as a 5 x 5 matrix form, where the results of the diagonal show the total for each type of insurance. We can analyze how the combined access to different types of insurance is by focusing on a specific row or column. For example, analyzing the first line with the first column of the two matrixes below, we find that 12.94% (8.09%) of the population have health insurance (microinsurance). Keeping the line and looking at the other columns, we conclude that 1.81% (0.40%) have health and vehicle insurance (microinsurance) at the same time; 2.22% (0.99%) health and life insurance; 0.29% (0.07%) health and pension funds, and finally 0.48% (0.31%) health and other insurance not specified here. Next, by looking at the second line, we evaluate how the access to car insurance interacts with the other types. The results are: 0.79% (0.11%) has life and car insurance, 0.13% (0.025) has car insurance or other type of insurance.

Access Matrix to Insurance					
	HEALTH	CAR	LIFE	PENSION FUND	OTHER
HEALTH	<b>12.94</b>	1.81	2.22	0.29	0.48
CAR	1.81	<b>2.95</b>	0.79	0.13	0.13
LIFE	2.22	0.79	<b>4.31</b>	0.16	0.35
PENSION FUND	0.29	0.13	0.16	<b>0.45</b>	0.02
OTHER	0.48	0.13	0.35	0.02	<b>1.41</b>

Source: CPS/FGV from the POF/IBGE's microdata

Access Matrix to Insurance					
Class CDE					
	HEALTH	CAR	LIFE	PENSION FUND	OTHER
HEALTH	<b>8.09</b>	0.40	0.99	0.07	0.31
CAR	0.40	<b>0.73</b>	0.11	0.02	0.02
LIFE	0.99	0.11	<b>2.56</b>	0.03	0.22
PENSION FUND	0.07	0.02	0.03	<b>0.16</b>	0.01
OTHER	0.31	0.02	0.22	0.01	<b>1.20</b>

Source: CPS/FGV from the POF/IBGE's microdata

Next, we make similar exercises but in a multivariate way, i.e., we control the access to different types of insurance. The difference of this present analysis is the fact that we control the access to insurance not only through other types of insurance (as before), but also through socio-demographic and economic characteristics of individuals. The advantage of this type of exercise is that you isolate effects such as income, education, among others, that is, we analyze, for example, the access to health insurance due to their lack of access to other insurances, comparing people with the same observable attributes. As presented in the previous statistics, the chances of controlled access to this type of insurance are higher when the individual has already some other insurance. For instance, they are up to 2.6 times higher in health insurance for those who have life insurance. The same result is found in the access to microinsurance, but in higher intensity: the chances are at least 3 times higher in three of the four items analyzed here.

### 8. Breakdown of the Demand for Microinsurance

In the traditional bivariate analysis, as illustrated in this section, we take the gross correlations of the insurance with each economic or socio-demographic variable taken in isolation. It quantifies the size of each market segment of the insurance and microinsurance without considering the existent interaction between the variables. For example, the fact that higher income and education are positively correlated with each other and also possibly associated with a greater demand for insurance prevents us from establishing exactly what is driving the demand for a specific type of insurance, income, education or both. That is why it is important to use multivariate models, where this interdependence between the variables is taken into account as in the previous section.

We explore two ways to consider the interdependence of variables. In the first one, we adopted a statistical procedure, where an initial set of variables entering the model is selected for its respective explanatory power. This allows us to explore a wider range of determinant factors of demand for insurance from the wealth of information provided by the POF, without imposing restrictions on the selection a priori. Data informs us what is or is not relevant in terms of explanatory power. A second strategy more related to the economic perspective is to impose a priori the variables used in the estimated model, possibly with some variables not significant. In this case, we selected the POF variables in order to allow us to work with the PNAD at the same time. The advantage of this procedure is to generate a uniform model for every type of insurance, and to direct the selection of variables to what is available in other micro-databases, as illustrated in the Box below:

### Access and Expenses Simulator

It is the Tool used to simulate the probabilities of access and average individual expenses on different types of insurances, through the combination of their attributes. Select their features in the form below and click on Simulate.

The graphs presented show, in order:

- a) Probabilities of having expenses on each item (using as a basis for calculating the portion of the population that answered the questionnaires of individual expenses)
- b) the average value spent

Example

### Access to Insurance (%) Estimated Models:

Total Insurance  
Pension Fund

Health Insurance  
Car Insurance

Life Insurance  
Other Insurances

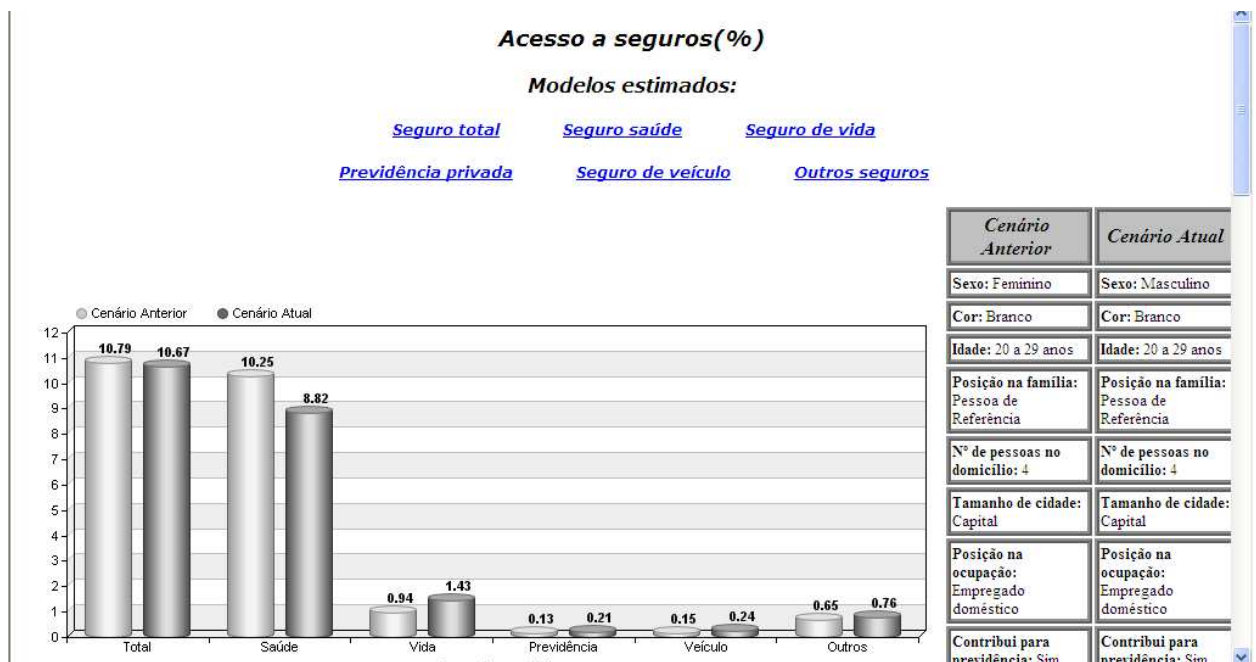
#### Previous Scenario

Gender: Female  
Color: White  
Age: 20-29 years  
Position in the Family: Reference person  
Number of people in the household: 4  
Size of the city: Capital  
Pension Fund Participant: Yes

#### Current Scenario

Gender: Male  
Color: White  
Age: 20-29 years  
Position in the Family: Reference Person  
Number of people in the household: 4  
Size of the city: Capital  
Pension Fund Participant: Yes

Total    Health    Life    Pension Fund    Car    Other



One of the bars represents the scenario now, with the result according to selected characteristics; and the other bar, the previous scenario that shows the previous simulation. All the models being used can be found at the research website. Throughout the text we presented the findings of the multivariate exercises: [link http://www.fgv.br/ibrecps/miseg/POF\\_sim/index.htm](http://www.fgv.br/ibrecps/miseg/POF_sim/index.htm)

## **a) Economic Variables**

### **Economic Classes**

As we discussed earlier with the multivariate models for the selection of variables to explain the access to insurance, income or its counterpart in terms of economic class is the major determinant for the access to insurance, health insurance and retirement plans. In class E, the access to insurance in general is 1.45%, and 52% of its policyholders have a plan / health insurance. In class D, its policyholders are 4.19% of the population and the proportion of plan / health insurance in relation to insurance is 63%. In class C, these figures are 15.69% (access) and 77% (composition health / insurances). The class AB presents the highest rates of both access to insurance in general (46.17%) and the proportion of policyholders with plan / health insurance (80%).

When we use the basic multivariate model, an individual in class AB with other similar characteristics has 16.9 times more chances to have insurance compared to class E. Among the analyzed insurances, we emphasize once again the access to car insurance, the probabilities of which are 165 times more, followed by pension fund, 34 times more.

## **Causality, Family Altruism and Health Insurance**

We use multivariate exercises with estimators for each difference in order to study the impact of income on the demand for health insurance by the Brazilian elderly population. The focus of the paper is to use the increased income transfers to low-income elderly people as a laboratory to identify the effects of income on health, separating the effects going in the opposite direction (who has access to better services would be more productive and could generate more income). The database was the health supplements of PNAD 1998 and 2003 that occurred during the expansion of programs like Continuous Cash Benefit (BPC) and the rural non-contributory pension fund. Again, results reveal that older people eligible to income transfer programs have differentiated improvement in the access to health services in the five year study, which is consistent with the idea that more income generates greater access to health insurance. The chance to gain access to health insurance between 1998 and 2003 was 37.8% higher in the beneficiary group of income transfers compared to the control group of the others. Secondly, corroborating with the existence of some family altruism, but lower than the first treatment group, there was 27.4% of gain in the chance of access to health insurance among the non-elderly, living with someone elderly eligible for income transfer programs.

## **Contribution for Public Pension Fund (Social Security)**

All studied insurances have direct relationship with the social security contribution. In other words, the social security contribution is a variable that indicates the occurrence of complementarities, not substitution effects between social insurances and social security. The access rate to different types of insurances (and microinsurance) is about three times higher among contributors than among other workers. In the controlled analysis for access to

insurance (microinsurance) contributors have 2.2 (2.3) times higher chances than other workers.

### **Employment Status**

The highest access rate to insurance occurs for employers (43.57%) and public employees (39.99%) in the total population. In class CDE, the access peak occurs with public employees (28.15%) and employers (25.21%). Self-employed workers have an access rate lower than the average of the general population, 13.22% in the category against 16.79% in all other categories. In the multivariate model, controlling through other considered characteristics, the fact that the person is an employer increases his/her chances of access to all items of insurance (microinsurance).

### **Income Risk**

PME uses a rotating panel methodology that seeks to gather information from the same households over the months. The approach used here consists of calculating the probabilities of transition into and out of the four economic groups, as well as of non-transition among these groups, observing the same people twice with twelve months in between starting in March 2002. The appearance of longitudinal data from household income per capita in this work will provide the basic empirical evidence for the pattern of social mobility observed in practice.

We opened the destinations of the transitions of each economic level per year. We presented the information year by year until the month of June, which could be one way to measure possible impacts of the crisis in the transition between classes. The data shows that the years 2004 and 2008 stand out in the statistics, with only 59.5% and 59.91% of the Class E remaining in Class E, a year after the first observation (collected in 2003 and 2007, respectively). If we look at what happened in the early months of 2009, compared to the same period a year earlier, there was an increase of 1 percentage point in the number of people remaining in Class E (60.83%). When we analyze the opposite extreme, those that remain located in the Class AB begin to show negative growth in 2008 and 2009. If we analyze the last period, the result was worse (74.63% remain AB between 2008 and 2009 - measured until June). It had been growing very strong, and began to lose strength.

### **Socio-Demographic Variables**

#### **Education**

Access to insurance increases monotonically with the individual's education, ranging from 6.16% (5.24%) for those under 3 years of study to 53.15% (34.87%) for those with 12 years or more. Recalling that the population of individuals is 15 years of age or older. Now, applying multivariate analysis, we see in all types of insurances that the chances increase according to the education of the individual. In determining the access to insurance (microinsurance) in their entireties, chances are 4.5 (5) times greater for those with 12 or more years of study in relation to functional illiterates. The biggest difference found is in car insurance, with increased chances at 7.9 (15) times in the more educated group.

## **Gender**

Men with 19.35% (12.63%) have higher access rates to insurance (microinsurance) than women, 14.24% (8.93%), perhaps due to a higher number of registered employed men, which implies greater access to benefits of life insurance and health plans, despite the fact that demand for health services is higher among women<sup>4</sup>.

As might be expected, in Class CDE the gap in the access to various types of insurance between genders is bigger than in the population as a whole. The biggest disparity is in the proportion of those who have car insurance: 5 insured men to each woman. In the total of the population, it is 3 to 1.

Using the basic model of access by gender, controlled through other variables, i.e., comparing exactly the same type of people in a series of attributes, except gender, the differences between men and women disappear. In other words, the chances of access to insurance (microinsurance) are not statistically different between them. This result derives from the combination of advantages for men and for women, depending on the different analyzed items of insurance (microinsurance): health insurance, more female, 18% higher (16%) against to that seen in car insurance, being 62% higher (2.2 times), life insurance 52% (46%) and pension funds 61% (85%) clearly more masculine, as in the bivariate analysis.

<sup>4</sup> NERI, Marcelo. *Quality on Health*. Center of Social Policies– IBRE/FGV. *Mimeo*.

### **Pregnant and Lactating Women**

When we open our data for female gender per current reproductive condition, we observe that women most in need of protection, namely pregnant women and nursing mothers have the lowest access rate to insurance (and microinsurance) in general, and health insurance in particular.

### **Race and Religion**

When we cross the data by race and religion there are differences in the access to insurance and even microinsurance. In the multivariate selection of variables, the religion variable as the race variable were not selected in any of the models of different types of insurance (or microinsurance), suggesting a contraindication of policies to niche the demand by people of different creeds and color.

### **Position in the Family**

When we look at the distribution of access to insurance through an intra-household perspective, the reference *person*, 23.56% (15.04%), followed by *pensioners*, 19.48% (14.21%), are the ones with greater access. The role of the primary household income provider indicates the need to protect the family from adverse shocks through reference people. In spite of the higher transience of marriage of modern times indicates the growing need by the spouse to acquire microinsurance.

### **Life Cycle**

Next, we evaluate the access in a life cycle perspective. The rate has an increased format up until a given age and thereafter it stabilizes in a higher level. The peaks are reached at different times, when we evaluate the total compared to the Class CDE. With 22.81% of access to insurance in the range of 50 to 59 years of age, the peak of microinsurance, for the CDE Class population, occurs in 15.08% in the range of 40 to 49 years of age .

The analysis of the multivariate life cycle suggests that the chances of an individual up to 39 years of age have insurance is less than the 70 years of age or older. It is important to highlight the particularities of every type of insurance: as we might expect, health insurance grows as the individual reaches old age; the same way that life insurance is higher in the intermediate ages.

## **c) Spatial Variables**

### **Urban Diseconomies**

Problems with violence in the region are associated with an increased demand for insurance in all forms taken by the POF, being always higher the access rate to insurance in the total population compared to the classes CDE. For individuals who reported problems with violence in the neighborhood, the access rate to insurance is 18.53% (11.55%) in total population (Class CDE) against 16% for insurances (and 10.45% for microinsurance) to those who did not report problems with violence. This effect tends to disappear in the multivariate model, which can be the result of opposing forces to the increased demand for insurance due to the perceived violence is not remedied by the provision of insurance for the same reasons.

### **Size of the City**

Both in the case of insurance as in the case of microinsurance in general, there is a higher access rate to insurance in the capitals than in other city sizes. The exceptions are in the case of life insurance and car microinsurance, where we found a higher access rate in cities outside the metropolitan axis. The lowest access rates are found in rural areas followed the outskirts of cities.

The Region proves to be an important variable in controlled determination of access to insurance. In general, the chances increase as we move from rural areas towards the capital. The ratio is even greater when we analyze health insurance and pension plans, with chances two times higher in the capital.

### **Capitals**

In the ranking of capitals for access to security and private pension funds services is Brasilia, with 46% of the insured population, a higher rate than that of the population of employers (43%), for example. Following, we have Vitória (36%) and São Paulo (30.4%). Finally, last in the ranking appears Boa Vista (5.5%), with a access rate to insurance rather higher than the population that never attended daycare or school (4.1%).

In view of microinsurance, that is, covering only the population of classes CDE, São Paulo has the highest rate, with the same level as Belo Horizonte, 18.2%, slightly less than the general population's access to high school (19.73%). Boa Vista (3.2%) also ranks among the worst place among capitals, with an access rate lower than the national average of class D (4.19%).

Ranking of access to security and pension fund services - Capitals					
Total Population		%	Classes CDE		%
Insurance			Microinsurance		
1	Brasília – DC	46,8	1	São Paulo - SP	18,2
2	Vitória - ES	36,3	2	Belo Horizonte - MG	18,2
3	São Paulo - SP	30,4	3	Belém - PA	17,3
4	Belo Horizonte - MG	26,8	4	Vitória - ES	17,1
5	Curitiba – PR	26,2	5	Cuiabá - MT	16,8
6	Porto Alegre - RS	25,1	6	Campo Grande - MS	16,4
7	Rio de Janeiro - RJ	24,8	7	Brasília – DC	15,3
8	Campo Grande – MS	24	8	Salvador - BA	15,1
9	Belém - PA	22,6	9	Curitiba – PR	14,7
10	Salvador - BA	22,5	10	Recife - PE	12,9
11	Cuiabá - MT	21,8	11	Natal - RN	12,9
12	Natal - RN	20,7	12	Goiânia – GO	12,4
13	Recife - PE	20	13	Fortaleza - CE	11,8
14	Goiânia - GO	19	14	Porto Alegre - RS	11,3
15	Fortaleza - CE	16,8	15	João Pessoa - PB	10,2
16	João Pessoa - PB	16,3	16	Teresina – PI	10,2
17	Maceió - AL	16,1	17	Maceió - AL	10
18	Florianópolis - SC	15,3	18	Porto Velho - RO	9,35
19	Teresina - PI	14,6	19	Rio de Janeiro - RJ	9,14
20	Porto Velho - RO	12,7	20	Aracaju – SE	8,92
21	Aracaju - SE	12,1	21	São Luís - MA	7,61
22	São Luís - MA	11,3	22	Rio Branco - AC	7,43
23	Rio Branco - AC	10,8	23	Florianópolis - SC	7,38
24	Macapá - AP	7,5	24	Palmas - TO	5,97
25	Palmas - TO	7,12	25	Macapá - AP	5,55
26	Manaus - AM	6,35	26	Manaus - AM	4,99
27	Boa Vista - RR	5,5	27	Boa Vista - RR	3,2

Source: CPS/FGV from the POF/IBGE's microdata

## Federal State

Below, we present a map of the access rate to insurance and microinsurance per federal state, using equivalent scales of color to facilitate comparison. In it, the states of South and Southeast stand out. In the first map of insurance, the negative exception is Santa Catarina. In the second map of microinsurance, the positive prominence state is Sao Paulo and the negative one is Rio de Janeiro.

Insurance – Total – Rate

Up to 5%

From 5% to 8%

From 8% to 10%

From 10% to 16%

More than 16%

In the controlled analysis, as we observe, the state of São Paulo presents all items with a greater chance of access. We also set a map of pent-up demand for insurance (microinsurance). Best explained: when comparing people with exactly the same observable attributes in Sao Paulo and Roraima, the first has 6 (7) times more likely to have access to insurance than the state of Roraima. Because they have the same characteristics, the person who lives in Roraima can be considered a potential case of access. In this case, the geographic isolation can be a hindrance. On the other hand, the comparison between Sao Paulo and Brasilia indicates that the republic's capital has 55% less chance of access to insurance and 58% lower in the case of microinsurance. Drawing the map on the same scale as other types of insurance, for visual identification of the most promising markets, namely those with high potential demand for insurance, due to the effect, for instance, of high-income or education and low access, they are identified with the lighter colors.

## Odds Ratio of Access to Insurance

Conditional Ratio of Access to Insurance – Total    Conditional Ratio of Access to Insurance – Health

Conditional Ratio – Total

Up to 0.300

From 0.300 to 0.450

From 0.451 to 0.600

From 0.601 to 0.800

More than 0.801

Conditional Ratio – Health

Up to 0.300

From 0.300 to 0.450

From 0.451 to 0.600

From 0.601 to 0.800

More than 0.801

Conditional Ratio of Access to Insurance – Life

Conditional Ratio – Life

Up to 0.300

From 0.300 to 0.450

From 0.451 to 0.600

From 0.601 to 0.800

More than 0.801

Conditional Ratio of Access to Insurance – Car

Conditional Ratio – Car

Up to 0.300

From 0.300 to 0.450

From 0.451 to 0.600

From 0.601 to 0.800

More than 0.801

Conditional Ratio of Access to Insurance – Pension  
Funds

Conditional Ratio of Access to Insurance-Other

Conditional Ratio– Pension Funds

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio – Other

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Source: CPS/FGV from the POF/IBGE's microdata

**Odds Ratio of Access to Microinsurance**

Conditional Ratio of Access to Microinsurance  
(Classes CDE) – Total

Conditional Ratio – Total

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio of Access to Insurance  
(Classes CFE) – Health

Conditional Ratio – Health

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio of Access to Insurance  
(Classes CDE) – Life

Conditional Ratio – Life

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio of Access to Insurance  
(Classes CFE) – Car

Conditional Ratio – Car

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio of Access to Insurance  
(Classes CDE) – Other

Conditional Ratio – Pension Funds

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Conditional Ratio of Access to Insurance  
(Classes CFE) – Pension Fund

Conditional Ratio – Other

Up to 0.300  
From 0.300 to 0.450  
From 0.451 to 0.600  
From 0.601 to 0.800  
More than 0.801

Source: CPS/FGV from the POF/IBGE's microdata

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